Radiation Budget Workshop , ECMWF Reading 2016, October 17-21th

ScaRab Instrument Monitoring and Data Status

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Radiation Budget Workshop
ScaRab Instrument Monitoring and Data Status

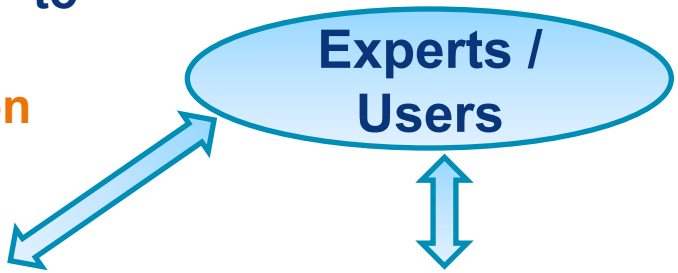
- CNES Center of Expertise
- Overview of ScaRab level1 products
- Quality Monitoring and Completeness of data archive
- Data Access

CNES Expertise Center
Overview of activities 1/4

Expertise Center

Monitoring and Expertise Center :

- Provide final users measurements in order to monitor the specifications linked to their needs
- Monitor the performances and assess correction parameters to be implemented , during all instruments lifetime



Parameters assessment
- Ground / on bord
- Goal : Correction

➔ To ensure an optimal instrument / image quality

Regular monitoring and measurements,
- Radiometric / geometric / spectral performances
- Monitoring on board parameters (telemetry decoding and analysis)

Support
Expertise activities (anomalies .. .)

Future
Preparation of future missions

Maintenance in Operationnal Conditions
Systems operationnal everyday (=> to limitate loss of activity)

Quality Label (« certificate ») for data generated with these parameters

CNES Expertise Center
Overview of activities 2/4

Expertise Center

Automatic Products Downloading

Data Production Center (ISSDC/ISRO)

Specific requests / Anomalies

Image Production Parameters (IODD)

Instrument / Image Quality centers

Spectral, Geometric, Radiometric Analyisis

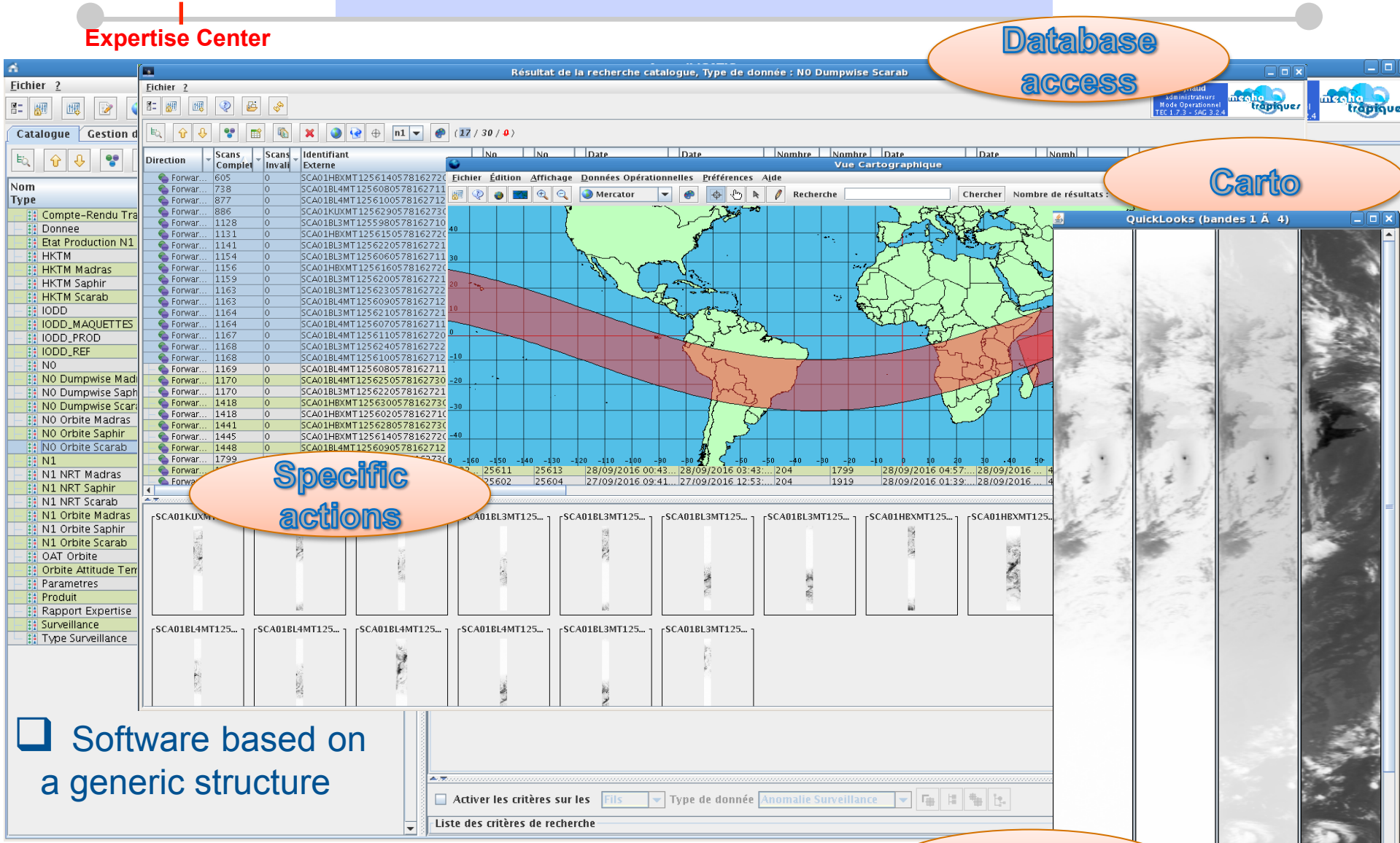
Generic tools mixing sensors

- optical calibration
- localisation performance
- …

Long terme archiving of data

CNES Expertise Center
Overview of activities 3/4

Expertise Center



- Software based on a generic structure

CNES Expertise Center
Overview of activities 4/4

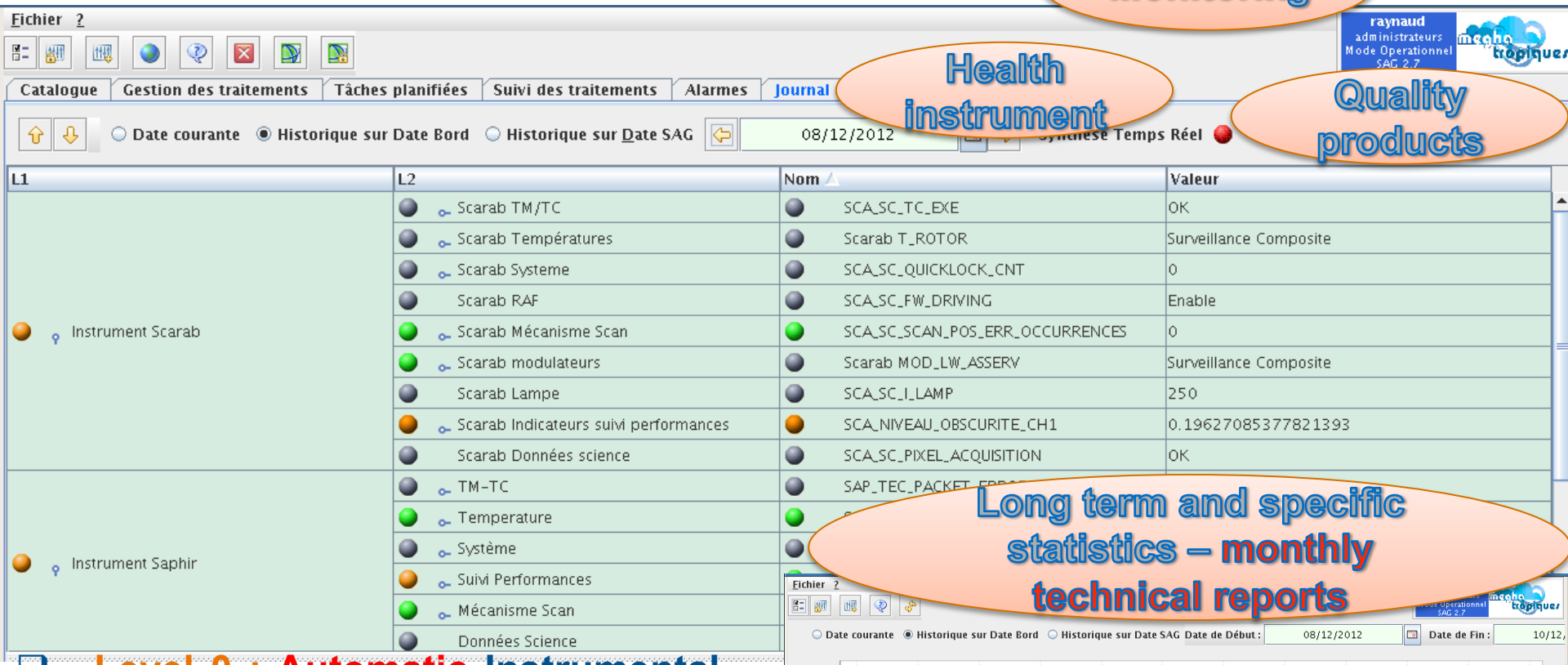
Expertise Center

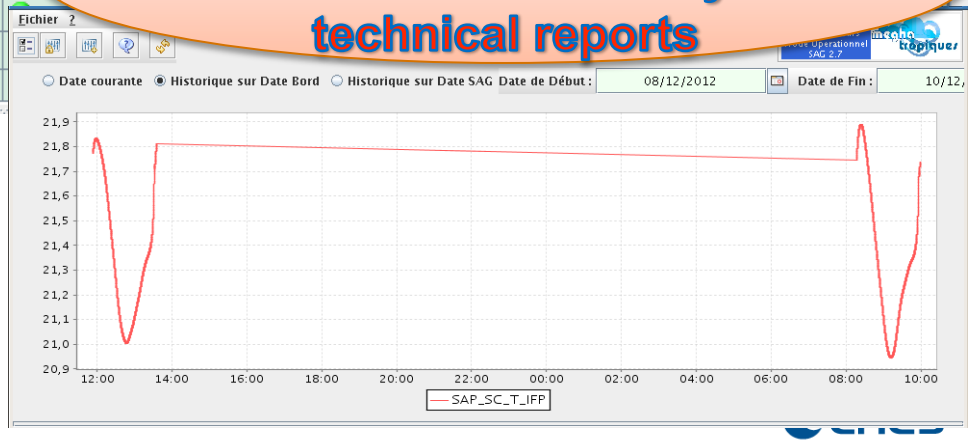
Monitoring

Health instrument

Quality products

Long term and specific statistics – monthly technical reports



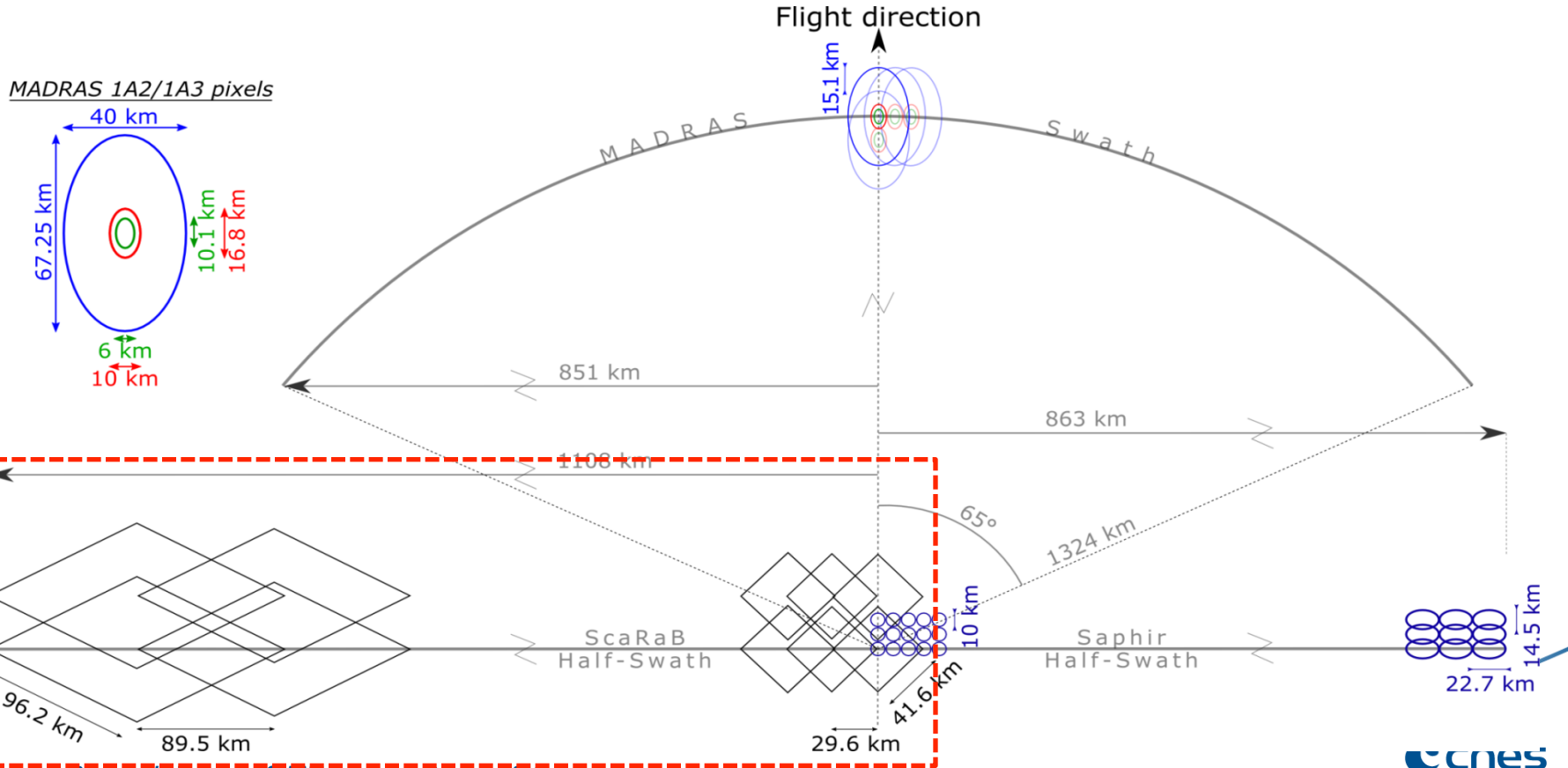


- **Level 0 : Automatic Instrumental Monitoring (health)**
- **Level 1 : Automatic monitoring of Quality products (% invalid samples/pixels)**

ScaRab : Products Definition 1/4

Scarab Products

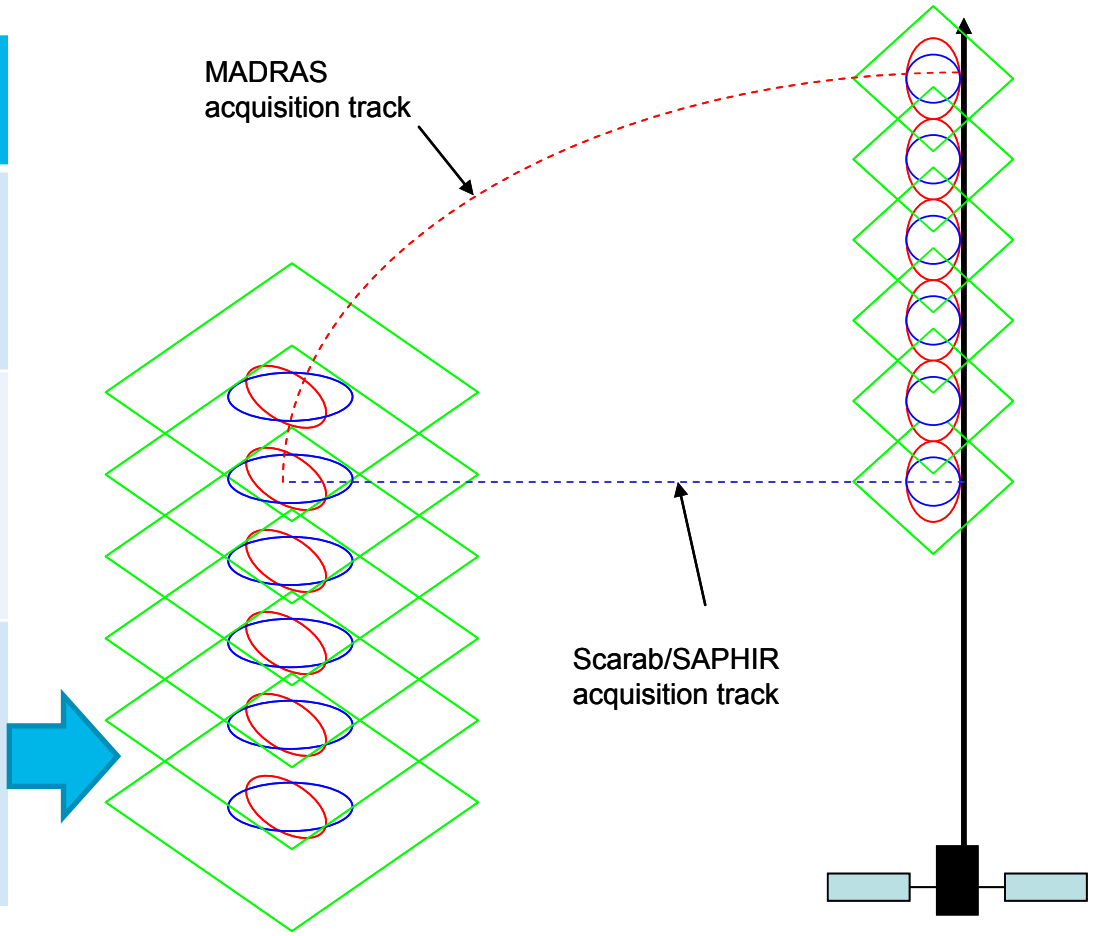
- **SCARAB : multi-spectral passive radiometer**
- **Also on board Megha-Tropiques satellite :**
  - MADRAS : microwave passive conical radiometer (9 canal)
  - SAPHIR : microwave passive radiometer, (6 canal, Xtrack 10km),



ScaRab : Products Definition 2/4

Scarab Products

Physical Level	SCARAB
Level 1A	Radiance sample (avec overlap)
Level 1A2	Idem 1A with improvement of channel registration
Level 1A3	Radiance projection in Madras 89Ghz grid



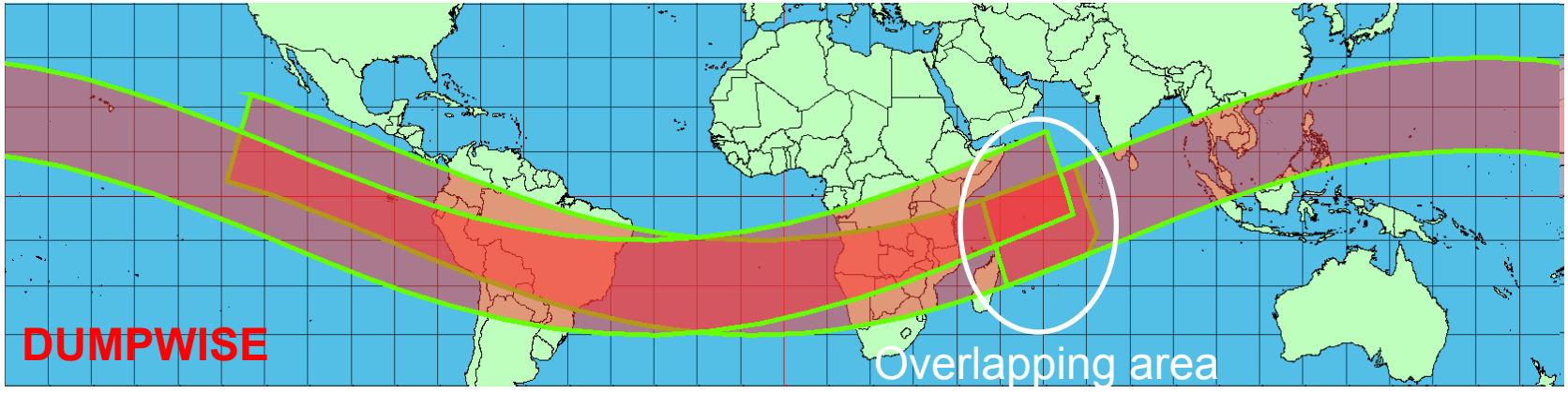
Pixel representation on ground of the 3 instruments

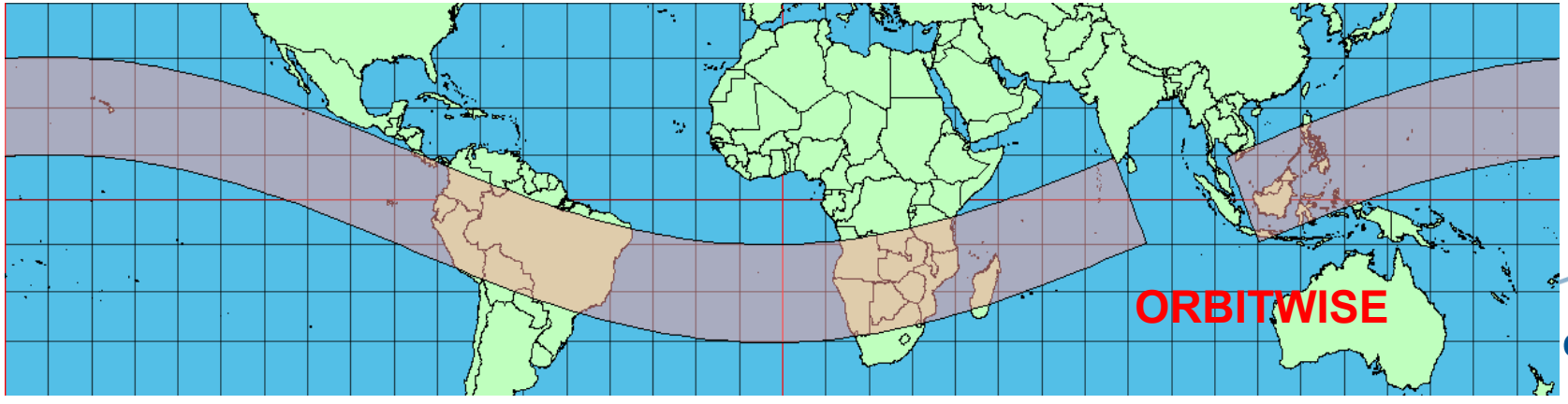
ScaRab : Products Definition 3/4

Scarab Products

❑ Products types

- **DUMPWISE Products :** data dumped over station without modification (various sizes possible), with overlapping area between consecutive products
  - » → Duplication of scans (data)
- **ORBITWISE Products :** combination of N (=1,2,3,…) DUMPWISE products
  ➔ product from equator to equator, superposition for same cycle orbit





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ScaRab : Products Definition 4/4

Scarab Products

❑ Identification L1A2 products

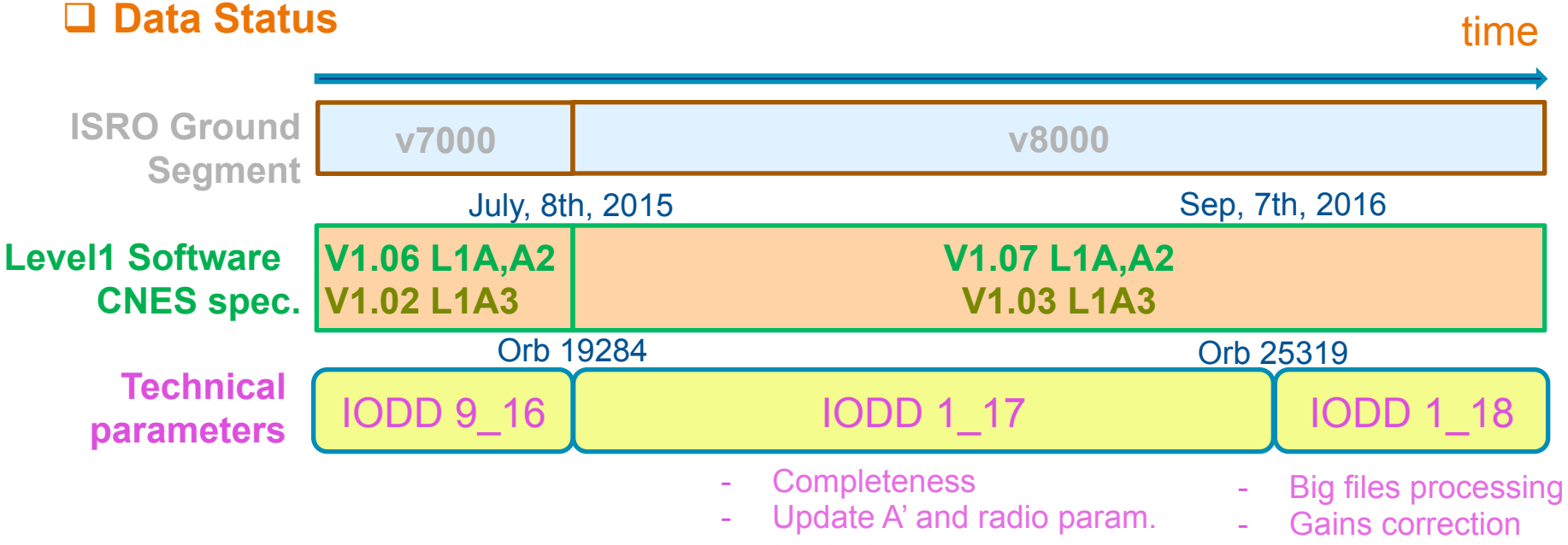
Dumpwise product :

MT1SCASL1A2_1.07_000_1_18_I_begindat_enddate_beginorbit_endorbit_DOY_cycleorbitdeb_cycleorbitend_Station_NumSegment

Orbitwise product :

MT1SCAOL1A2_1.07_1_18_I_[begin_date]_DOY_cycleorbit_absoluteorbit

❑ Data Status



- **Technical document to explain Gains & A' updated topic**

ScaRab : Monitoring Activities 1/5

Data Monitoring

❑ SCARAB : Monitoring [01/11/2014 – 01/09/2016]

- **Products monitoring**
  - **288 Parameters monitored :**
    - ✓ **26 L1 quality parameters , 262 L0 health parameters (per scan and/or per orbit)**
  - **SCARAB L0 products**
    - ✓ **8 463 Dumpwises products → 8440 L0 Orbitwises monitored**
    - ✓ **More than 330 millions monitoring values generated**
  - **SCARAB L1 products**
    - ✓ **31 512 products monitored (L1A& A2 Dump&Orb)**
    - ✓ **More than 756 000 monitoring values generated**
  - **Anomalies raised**
    - ✓ **Warnings & Errors on the period : 89 165 ←→ 0,027 % of whole monitoring**

➔ Instrument Status OK

➔ L1 Data Quality OK *(actions & investigations ongoing to improve it)*

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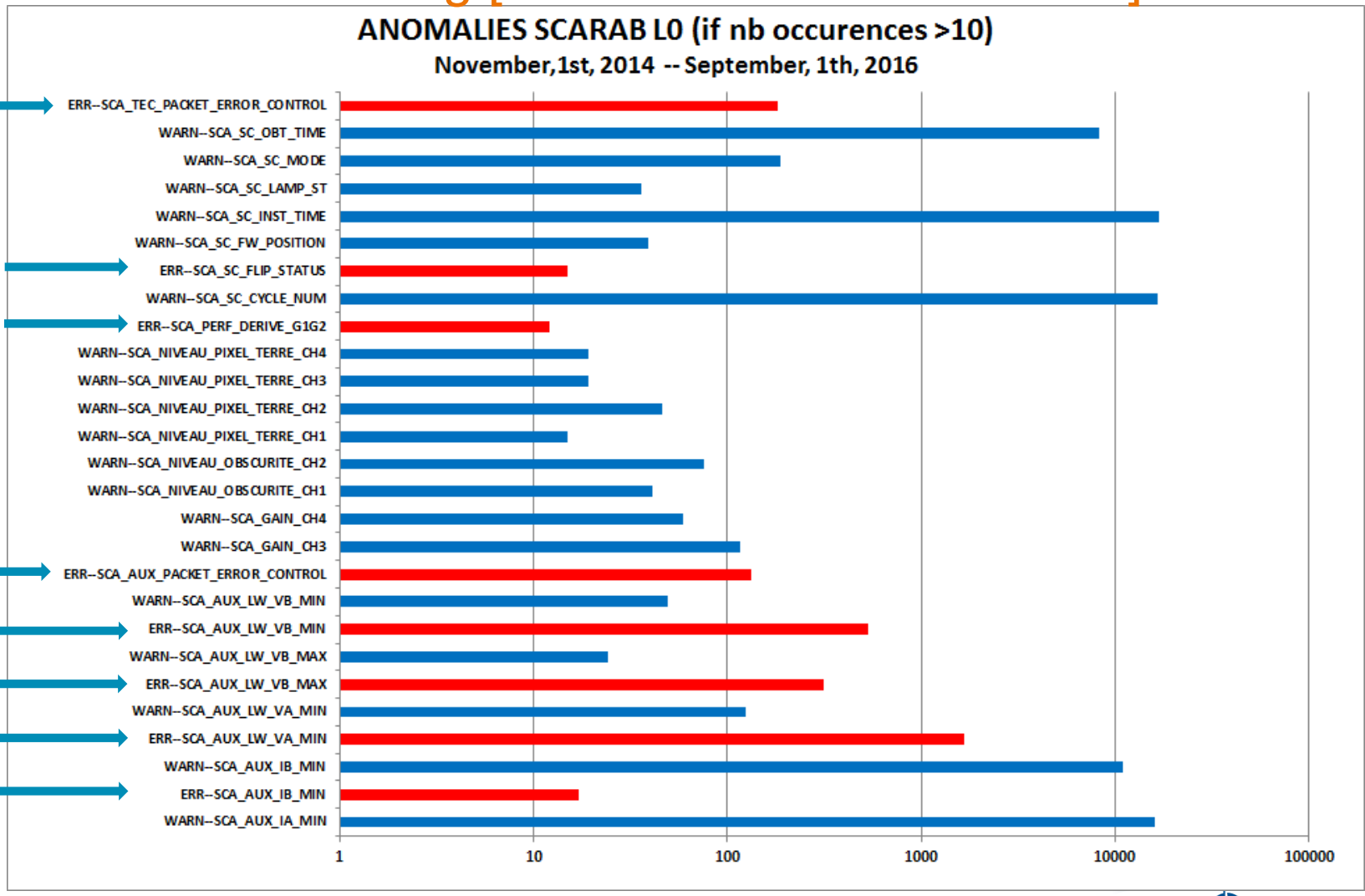
ScaRab : Monitoring Activities 2/5

Data Monitoring

❑ SCARAB : L0 Monitoring [01/11/2014 – 01/09/2016]



ScaRab : Monitoring Activities 3/5

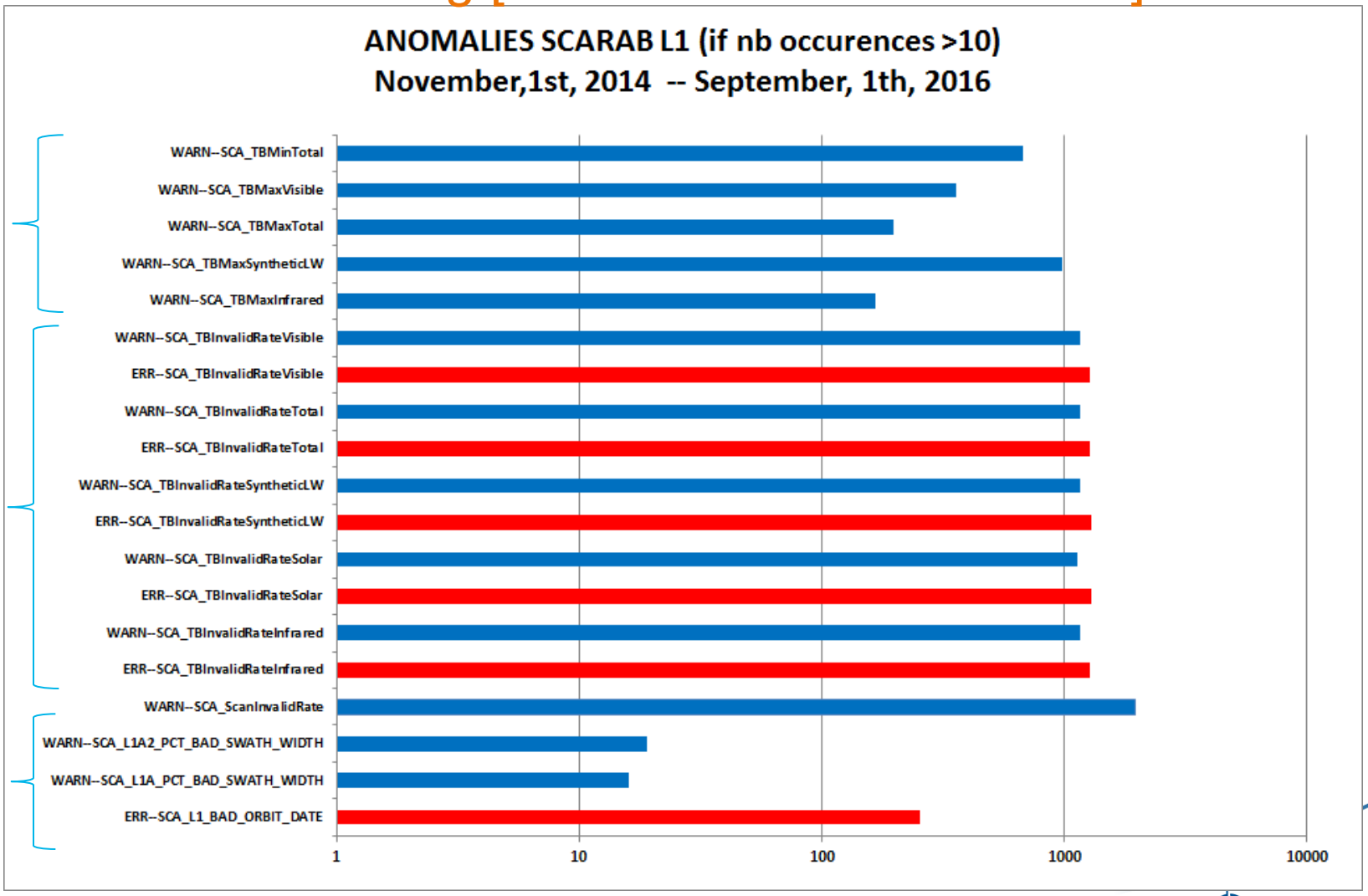
Data Monitoring

❑ SCARAB : L1 Monitoring [01/11/2014 – 01/09/2016]

Control on min/max values

Control on percentage of invalid radiances (error if >30%)

New monitoring Swath and datation

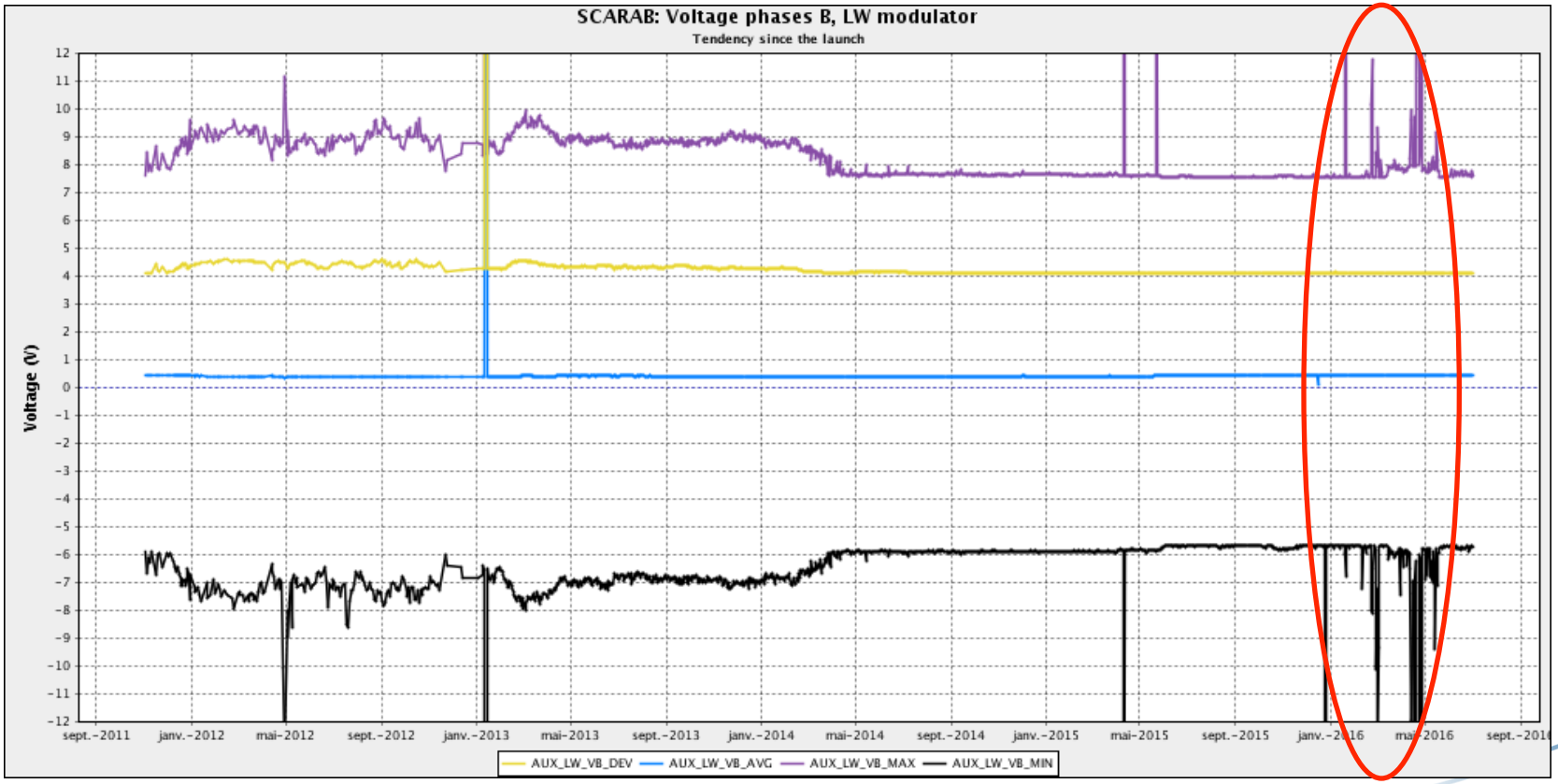


ScaRab : Monitoring Activities 4/5

Data Monitoring

❑ SCARAB : Exemple of instrumental monitoring

Recent warnings on modulator mechanism : surely due to lubricant cluster → situation currently back to normal

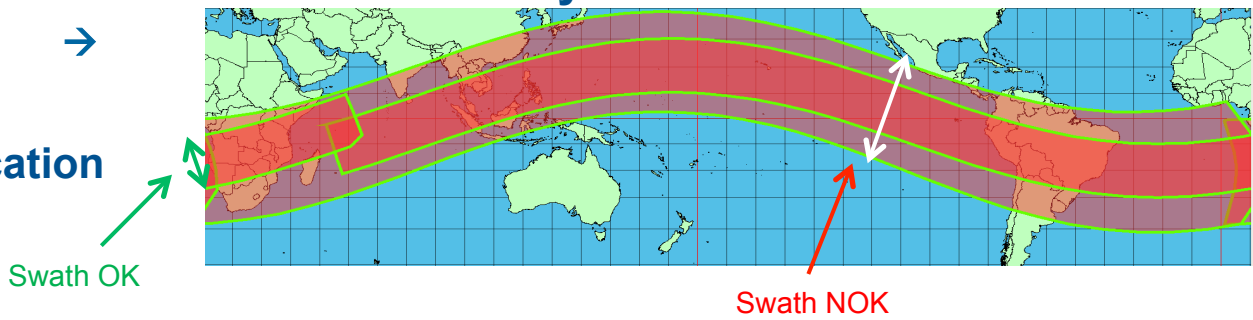


ScaRab : Monitoring Activities 5/5

Data Monitoring

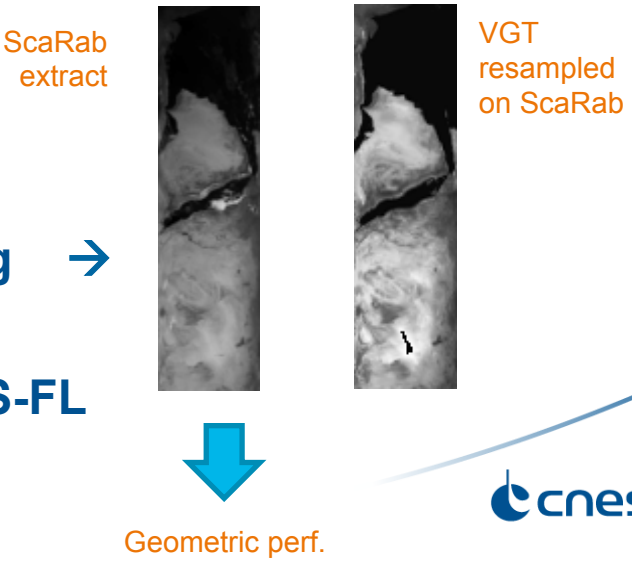
❑ SCARAB : Main new processing in L0 / L1 monitoring

- ✦ **SCARAB Automatic Processing of monthly radiometric calibration**
- ✦ **New Monitoring parameters on L1 Data Quality**
  - ✓ **Check on swath width →**
  - ✓ **datation monotony**
  - ✓ **consistency of geolocation quality flags**
  - ✓ **Orbit size…**
- ✦ **Global Monitoring improvment**



❑ SCARAB : evolutions to come

- ✦ **Automatic geometric performances monitoring →**
- ✦ **Monitoring of invalid geolocations percentage**
- ✦ **New radiometric monitoring parameter : A' MS-FL**
  - ✓ **to replace A' MS-TOT currently monitored**



Level1 Product Archive Completeness and Quality

Product Archive

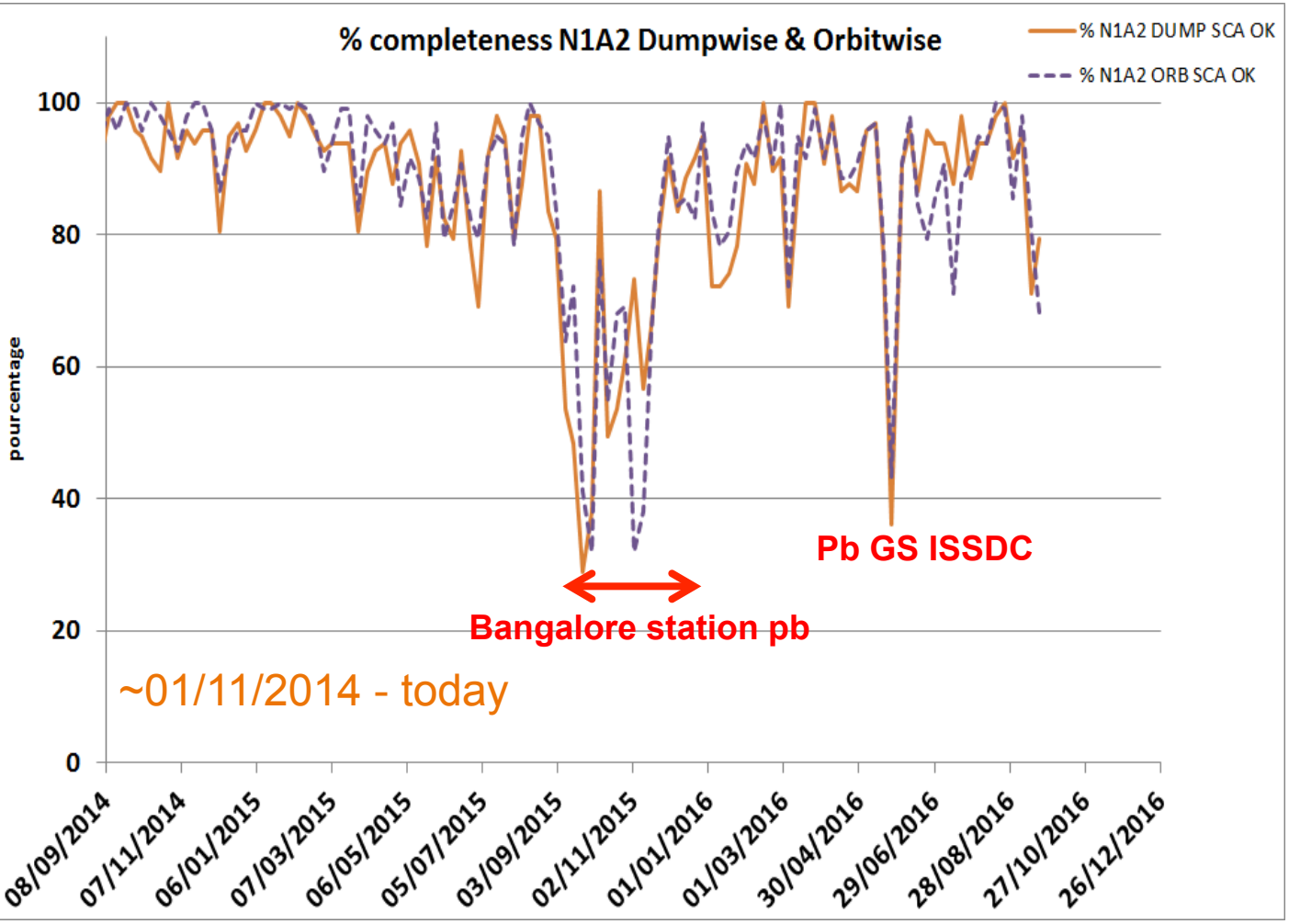
❑ Archive products in CNES premises

- **Analysis Criterion : *Completeness***
  - ✦ theoretical comparison with the number of orbits expected

- **Analysis Criterion : *Quality***
  - ✦ Average % of invalid radiances on all channels
  - ✦ Only based on **radiance quality flag values**
  - ✦ Estimated on all products available
  - ✦ Specific value per level (L1A,L1A2) and type (Dumpwise, Orbitwise)

Level1 Product Archive Completeness

Product Archive



% Completeness

Nov. 1th 2014 → Sep. 1th 2016

Average % data vs theory

L0 Dumpwise :

89%

L1A2 Dumpwise :

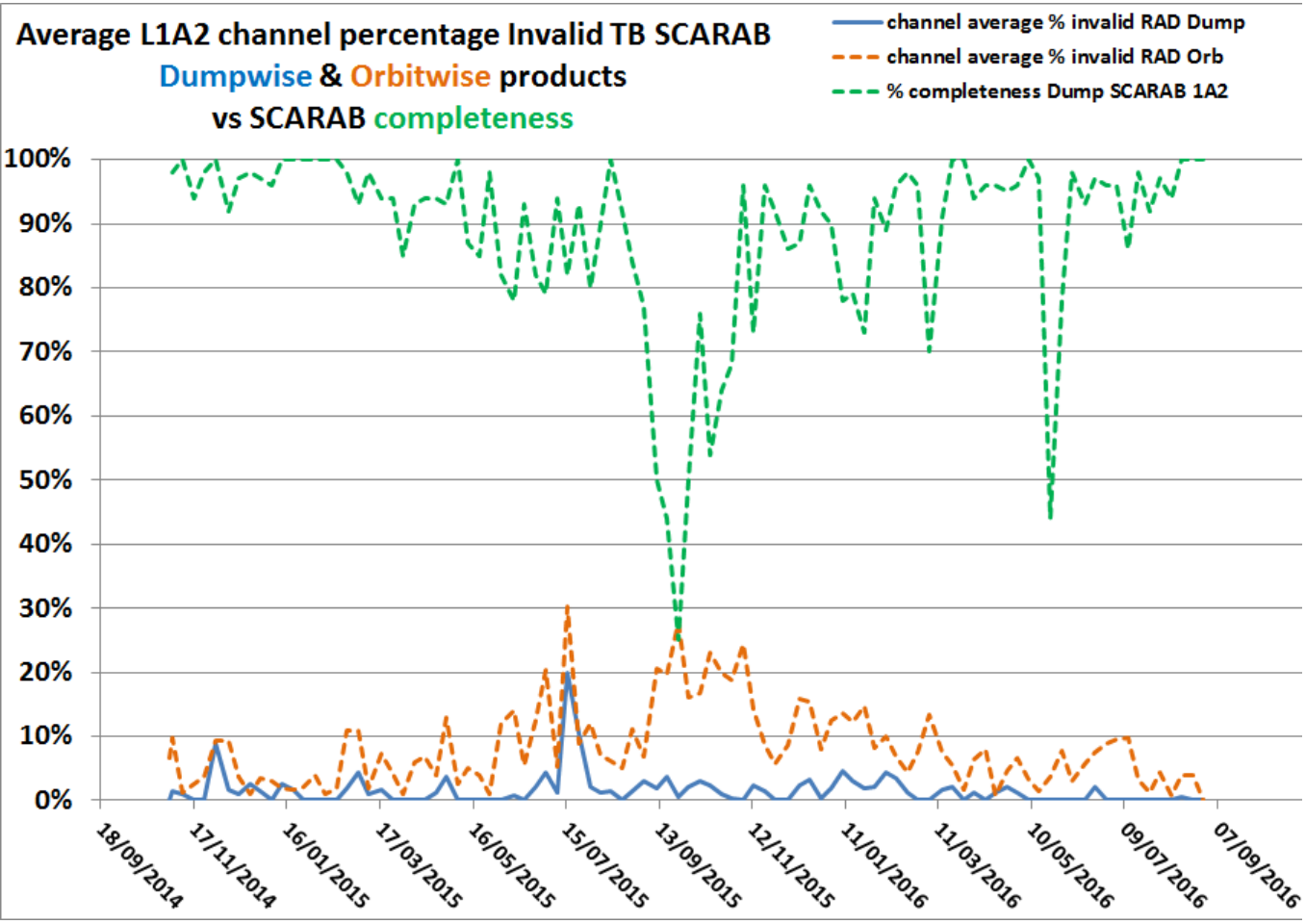
86%

L1A2 Orbitwise :

87%

Level1 Product Archive Quality

Product Archive



% Invalid radiances

Nov. 1th 2014 → Sep. 1th 2016

Average % invalid rad.

L1 Dumpwise : 1,53 %

- Nominal result

L1 Orbitwise : 8,22 %

- % bigger vs dump.
- In investigation, **not necessary an anomaly**
- Overestimation suspected because of difference of management between Dumpwises and Orbitwise

→ if no Dump generation of invalid data in Orbitwise

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Data Access : ICARE server

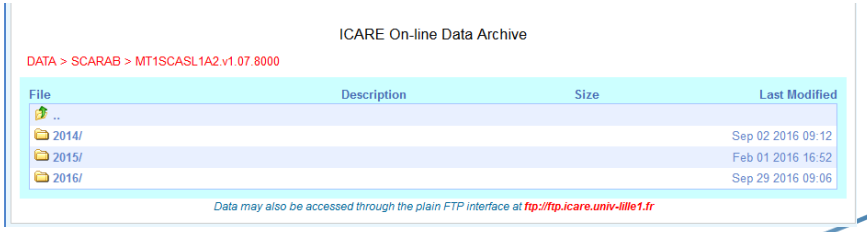
Data Acess

How to download products ?

www.icare.univ-lille1.fr

Data Access/
Data Archive
+ login

Scarab



Navigation and downloading

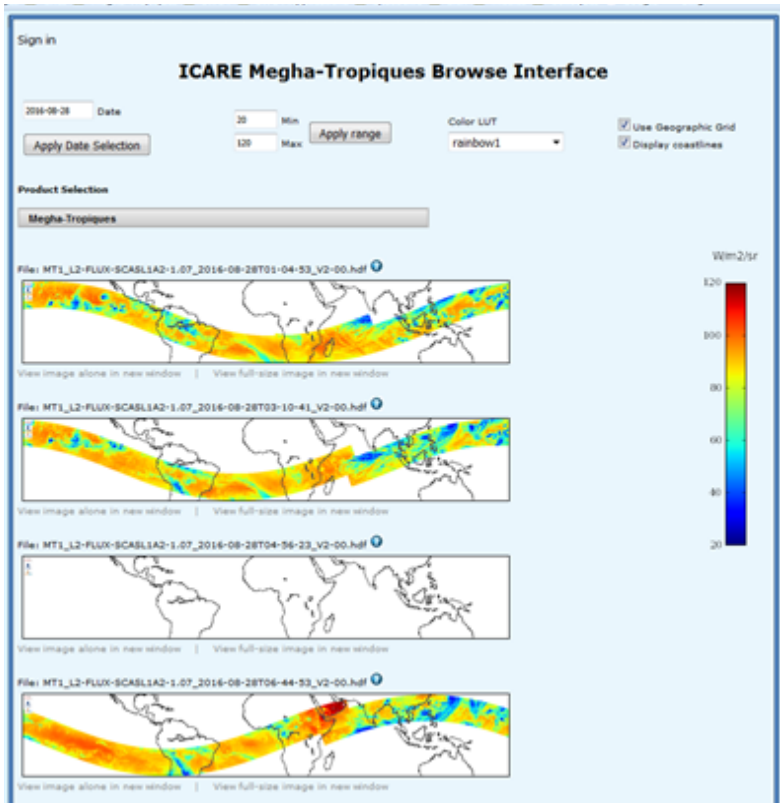
Data Access : ICARE server

How to browse products

www.icare.univ-lille1.fr

Data Access/
Browse
Images
+ login

L2 flux



Data Access : ICARE server

Contacts

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Remark :

- LINUX users
- Possible access to package of files to download :
- Specific shell to execute

Conclusion

❑Scarab in Megha-Tropiques expertise center

- « Living » Monitoring
  - ➔ Automatic monitoring analysed by experts
  - ➔On going activities on monitoring parameters (evolutions to come)

- Instrument Status and Level1 Average data quality OK

Level1 (radiances) type	Completeness vs theory *since 01/11/2014*	Quality % invalid radiances *since 01/11/2014*
L1A2 DUMPWISE	86%	1,53%
L1A2 ORBITWISE	87%	8,22% (*)

(*) over-estimation suspected, not necessary an anomaly

Questions ?

CNES-ISRO *stamp for 50years of cooperation*